H0594 TNU/LSCR+

Thermo Nutech
W.O. No. N9-10-216-7260

Bechtel Hanford Inc.
SDG H0594

Case Narrative

1.0 GENERAL

Bechtel Hanford Inc. Sample Delivery Group H0594 is composed of one solid (soil) sample designated under SAF No. B99-089 with a Project Designation of: 200 Area Groundwater Well Drilling Waste Designation.

The sample was received as stated on the Chain-of-Custody document. Any discrepancies are noted on the TNU Sample Receipt Checklist. The results were transmitted to BHI via facsimile on November 29 with the exception of Gamma Scan and Tritium, which was sent via fax on December 1, 1999.

2.0 ANALYSIS NOTES

2.1 *Total Strontium Analyses*

No problems were encountered during the course of the analyses.

2.2 Total Uranium Analyses

The result for the QC blank is reported as 0 pCi/g. The actual calculated result was −1.103E-04 ± 1.07E-04 ug/sample.

2.3 Gamma Spec Analyses

No problems were encountered during the course of the analyses.

2.4 Tritium Analyses

No problems were encountered during the course of the analyses.

2.5 Gross Alpha and Gross Beta Analyses

The recovery for the gross alpha LCS was 79%, less than the protocol lower limit of 80%. Gross alpha activity greater than the samples MDA but less than the RDL was detected in the sample.

SDG 7260
Contact Kevin C. Johnson

WORK SUMMARY, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0594

CLIENT SAMPLE ID / LOCATION / CUSTODY	SAF No	MATRIX	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUF-FIX	ANALYZED	REVIEWED	BY	METHOD
Spike (N910216-01)			N910216-05	7260-005	H		11/30/99	12/01/99	NJV	Tritium in Soil
200 Area		SOLID	10/22/99							
	B99-089		10/27/99							

COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
80A/80	B99-089	Gross Alpha in Soil	EPA900.0	1			1	1	1		4
80B/80	B99-089	Gross Beta in Soil	EPA900.0	1			1	1	1		4
GAM	B99-089	Gamma Scan	GAMMAHI	1			1	1	1		4
H	B99-089	Tritium in Soil	EPA906.0	1			1	1	1	1	5
SR	B99-089	Total Strontium in Soil	SRTOTAL	1			1	1	1		4
U_T	B99-089	Uranium, Total in Soil	UKPA	1			1	1	1		4
TOTALS				6			6	6	6	1	25

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CWS
Version 3.06
Report date 12/01/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0594

SAMPLE SUMMARY

SDG 7260
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0594

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAF NO	CHAIN OF CUSTODY	COLLECTED
B0WPB1	200 Area	SOLID		N910216-01	B99-089	B99-089-01	10/22/99 09:10
Method Blank		SOLID		N910216-03	B99-089		
Method Blank		SOLID		N910216-07	B99-089		
Lab Control Sample		SOLID		N910216-02	B99-089		
Lab Control Sample		SOLID		N910216-06	B99-089		
Duplicate (N910216-01)	200 Area	SOLID		N910216-04	B99-089		10/22/99 09:10
Duplicate (N910216-01)	200 Area	SOLID		N910216-08	B99-089		10/22/99 09:10
Spike (N910216-01)	200 Area	SOLID		N910216-05	B99-089		10/22/99 09:10

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CS
Version 3.06
Report date 12/01/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0594

QC SUMMARY

SDG 7260
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0594

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	DAYS SINCE COLL	LAB SAMPLE ID	DEPARTMENT SAMPLE ID
7260	B99-089-01	B0WPB1	SOLID	87.6			10/27/99	5	N910216-01	7260-001
		Method Blank	SOLID						N910216-03	7260-003
		Method Blank	SOLID						N910216-07	7260-007
		Lab Control Sample	SOLID						N910216-02	7260-002
		Lab Control Sample	SOLID						N910216-06	7260-006
		Duplicate (N910216-01)	SOLID	87.6			10/27/99	5	N910216-04	7260-004
		Duplicate (N910216-01)	SOLID				10/27/99	5	N910216-08	7260-008
		Spike (N910216-01)	SOLID				10/27/99	5	N910216-05	7260-005

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-QS
Version 3.06
Report date 12/01/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0594

PREP BATCH SUMMARY

SDG 7260
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0594

TEST	MATRIX	METHOD	PREPARATION BATCH	ERROR 2σ %	PLANCHETS ANALYZED CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG	MS/ORIG	QUALIFIERS
Beta Counting												
SR	SOLID	Total Strontium in Soil	6904-184	10.0	1			1	1	1/1		
Gas Proportional Counting												
80A	SOLID	Gross Alpha in Soil	6904-184	20.0	1			1	1	1/1		
80B	SOLID	Gross Beta in Soil	6904-184	15.0	1			1	1	1/1		
Gamma Spectroscopy												
GAM	SOLID	Gamma Scan	6904-184	15.0	1			1	1	1/1		
Kinetic Phosphorimetry												
U_T	SOLID	Uranium, Total in Soil	6904-184	9.0	1			1	1	1/1		X
Liquid Scintillation Counting												
H	SOLID	Tritium in Soil	6904-184	10.0	1			1	1	1/1	1/1	

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.
Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-PBS
Version 3.06
Report date 12/01/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0594

WORK SUMMARY

SDG 7260
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0594

CLIENT SAMPLE ID / LOCATION / CUSTODY	SAF No	MATRIX	LAB SAMPLE ID / COLLECTED / RECEIVED	PLANCHET	TEST	SUFFIX	ANALYZED	REVIEWED	BY	METHOD
B0WPB1			N910216-01	7260-001	80A/80		11/24/99	11/29/99	NJV	Gross Alpha in Soil
200 Area		SOLID	10/22/99	7260-001	80B/80		11/24/99	11/29/99	NJV	Gross Beta in Soil
B99-089-01	B99-089		10/27/99	7260-001	GAM		11/29/99	12/01/99	NJV	Gamma Scan
				7260-001	H		11/30/99	12/01/99	NJV	Tritium in Soil
				7260-001	SR		11/19/99	11/29/99	NJV	Total Strontium in Soil
				7260-001	U_T		11/11/99	11/29/99	NJV	Uranium, Total in Soil
Method Blank			N910216-03	7260-003	80A/80		11/24/99	11/29/99	NJV	Gross Alpha in Soil
		SOLID		7260-003	80B/80		11/24/99	11/29/99	NJV	Gross Beta in Soil
	B99-089			7260-003	H		11/30/99	12/01/99	NJV	Tritium in Soil
				7260-003	SR		11/19/99	11/29/99	NJV	Total Strontium in Soil
				7260-003	U_T		11/11/99	11/29/99	NJV	Uranium, Total in Soil
Method Blank			N910216-07	7260-007	GAM		11/29/99	12/01/99	NJV	Gamma Scan
		SOLID								
	B99-089									
Lab Control Sample			N910216-02	7260-002	80A/80		11/24/99	11/29/99	NJV	Gross Alpha in Soil
		SOLID		7260-002	80B/80		11/24/99	11/29/99	NJV	Gross Beta in Soil
	B99-089			7260-002	H		11/30/99	12/01/99	NJV	Tritium in Soil
				7260-002	SR		11/19/99	11/29/99	NJV	Total Strontium in Soil
				7260-002	U_T		11/11/99	11/29/99	NJV	Uranium, Total in Soil
Lab Control Sample			N910216-06	7260-006	GAM		11/29/99	12/01/99	NJV	Gamma Scan
		SOLID								
	B99-089									
Duplicate (N910216-01)			N910216-04	7260-004	80A/80		11/24/99	11/29/99	NJV	Gross Alpha in Soil
200 Area		SOLID	10/22/99	7260-004	80B/80		11/24/99	11/29/99	NJV	Gross Beta in Soil
	B99-089		10/27/99	7260-004	H		11/30/99	12/01/99	NJV	Tritium in Soil
				7260-004	SR		11/19/99	11/29/99	NJV	Total Strontium in Soil
				7260-004	U_T		11/11/99	11/29/99	NJV	Uranium, Total in Soil
Duplicate (N910216-01)			N910216-08	7260-008	GAM		11/29/99	12/01/99	NJV	Gamma Scan
200 Area		SOLID	10/22/99							
	B99-089		10/27/99							

Lab id TMANC
Protocol Hanford
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TMA / RICHMOND

SAMPLE DELIVERY GROUP H0594

N910216-03 Method Blank

METHOD BLANK

SDG 7260 Client/Case no Hanford SDG H0594
Contact Kevin C. Johnson Contract TRB-SBB-207925

Lab sample id N910216-03 Client sample id Method Blank
Dept sample id 7260-003 Material/Matrix SOLID
SAF No B99-089

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	0.395	2.0	3.8	10	U	80A
Gross Beta	12587-47-2	-0.574	3.2	5.6	15	U	80B
Tritium	10028-17-8	-0.001	0.051	0.086	400	U	H
Total Uranium (ug/g)	7440-61-1	0	0	0	1.0	J	U_T
Total Strontium	SR-RAD	0.026	0.14	0.20	1.0	U	SR

200 Area Grndwtr Well Drllng Wst Des

QC-BLANK 32311

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 12/01/99

TMA / RICHMOND

SAMPLE DELIVERY GROUP H0594

N910216-07 Method Blank

METHOD BLANK

SDG 7260 Client/Case no Hanford SDG H0594
Contact Kevin C. Johnson Contract TRB-SBB-207925

Lab sample id N910216-07 Client sample id Method Blank
Dept sample id 7260-007 Material/Matrix SOLID
SAF No B99-089

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Potassium 40	13966-00-2	U		0.075		U	GAM
Cobalt 60	10198-40-0	U		0.006	0.050	U	GAM
Cesium 137	10045-97-3	U		0.005	0.10	U	GAM
Europium 152	14683-23-9	U		0.015	0.10	U	GAM
Europium 154	15585-10-1	U		0.019	0.10	U	GAM
Europium 155	14391-16-3	U		0.012	0.10	U	GAM
Radium 226	13982-63-3	U		0.012	0.10	U	GAM
Radium 228	15262-20-1	U		0.022	0.20	U	GAM
Thorium 228	14274-82-9	U		0.009		U	GAM
Thorium 232	TH-232	U		0.022		U	GAM
Americium 241	14596-10-2	U		0.012		U	GAM
Uranium 238	U-238	U		0.74		U	GAM
Uranium 235	15117-96-1	U		0.019		U	GAM

200 Area Grndwtr Well Drllng Wst Des

QC-BLANK 32509

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 12/01/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0594

N910216-02 Lab Control Sample

LAB CONTROL SAMPLE

SDG 7260 Client/Case no Hanford SDG H0594

Contact Kevin C. Johnson Case no TRB-SBB-207925

Lab sample id N910216-02 Client sample id Lab Control Sample

Dept sample id 7260-002 Material/Matrix SOLID

SAF No B99-089

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	152	13	3.6	10		80A	192	7.7	79	73-127	80-120
Gross Beta	223	11	6.4	15		80B	226	9.0	99	76-124	80-120
Tritium	6.18	0.17	0.086	400	J	H	6.35	0.25	97	84-116	80-120
Total Uranium (ug/g)	1.81	0.21	0.002	1.0	X	U_T	1.86	0.074	97	78-122	80-120
Total Strontium	13.9	0.85	0.56	1.0		SR	13.6	0.54	102	81-119	

200 Area Grndwtr Well Drlng Wst Des

QC-LCS 32310

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 12/01/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0594

N910216-06 Lab Control Sample

LAB CONTROL SAMPLE

SDG 7260 Client/Case no Hanford SDG H0594

Contact Kevin C. Johnson Case no TRB-SBB-207925

Lab sample id N910216-06 Client sample id Lab Control Sample

Dept sample id 7260-006 Material/Matrix SOLID

SAF No B99-089

ANALYTE	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Cobalt 60	0.642	0.045	0.017	0.050		GAM	0.638	0.026	101	74-126	80-120
Cesium 137	0.668	0.036	0.021	0.10		GAM	0.641	0.026	104	74-126	80-120

200 Area Grndwtr Well Drllng Wst Des

QC-LCS 32508

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 12/01/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0594

N910216-04 B0WPB1

DUPLICATE

SDG 7260 Client/Case no Hanford SDG H0594

Contact Kevin C. Johnson Case no TRB-SBB-207925

DUPLICATE		ORIGINAL			
Lab sample id	N910216-04	Lab sample id	N910216-01	Client sample id	B0WPB1
Dept sample id	7260-004	Dept sample id	7260-001	Location/Matrix	200 Area SOLID
		Received	10/27/99	Collected	10/22/99 09:10
% solids	87.6	% solids	87.6	Custody/SAF No	B99-089-01 B99-089

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ PROT TOT LIMIT
Gross Alpha	10.2	3.5	3.0	10		80A	6.18	3.2	3.8	J	49	97
Gross Beta	13.9	4.9	7.1	15	J	80B	13.6	4.2	5.6	J	2	77
Tritium	0.024	0.051	0.086	400	U	H	0.032	0.052	0.087	U	-	
Total Uranium (ug/g)	0.374	0.041	0.005	1.0	J	U_T	0.367	0.041	0.005	J	2	30
Total Strontium	-0.019	0.23	0.29	1.0	U	SR	0.003	0.14	0.20	U	-	

200 Area Grndwtr Well Drllng Wst Des

QC-DUP#1 32312

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 12/01/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0594

N910216-08 B0WPB1

DUPLICATE

SDG 7260 Client/Case no Hanford SDG H0594

Contact Kevin C. Johnson Case no TRB-SBB-207925

DUPLICATE		ORIGINAL		
Lab sample id N910216-08	Lab sample id N910216-01	Client sample id B0WPB1		
Dept sample id 7260-008	Dept sample id 7260-001	Location/Matrix 200 Area	SOLID	
	Received 10/27/99	Collected 10/22/99 09:10		
	% solids 87.6	Custody/SAF No B99-089-01	B99-089	

ANALYTE	DUPLICATE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ORIGINAL pCi/g	2σ ERR (COUNT)	MDA pCi/g	QUALI-FIERS	RPD %	3σ PROT TOT LIMIT
Potassium 40	11.8	0.67	0.30			GAM	12.4	0.68	0.32		5	34
Cobalt 60	U		0.031	0.050	U	GAM	U		0.034	U	-	
Cesium 137	U		0.030	0.10	U	GAM	U		0.029	U	-	
Europium 152	U		0.086	0.10	U	GAM	U		0.072	U	-	
Europium 154	U		0.11	0.10	U	GAM	U		0.12	U	-	
Europium 155	U		0.092	0.10	U	GAM	U		0.064	U	-	
Radium 226	0.441	0.063	0.067	0.10		GAM	0.478	0.065	0.061		8	43
Radium 228	0.822	0.14	0.14	0.20		GAM	0.938	0.15	0.14		13	47
Thorium 228	0.733	0.039	0.038			GAM	0.819	0.040	0.037		11	34
Thorium 232	0.822	0.14	0.14			GAM	0.938	0.15	0.14		13	47
Americium 241	U		0.12		U	GAM	U		0.051	U	-	
Uranium 238	U		4.0		U	GAM	U		4.5	U	-	
Uranium 235	U		0.12		U	GAM	U		0.11	U	-	

200 Area Grndwtr Well Drllng Wst Des

QC-DUP#1 32510

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 12/01/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0594

N910216-05 B0WPB1

MATRIX SPIKE

SDG 7260 Client/Case no Hanford SDG H0594

Contact Kevin C. Johnson Case no TRB-SBB-207925

MATRIX SPIKE		ORIGINAL			
Lab sample id	N910216-05	Lab sample id	N910216-01	Client sample id	B0WPB1
Dept sample id	7260-005	Dept sample id	7260-001	Location/Matrix	200 Area SOLID
		Received	10/27/99	Collected	10/22/99 09:10
		% solids	87.6	Custody/SAF No	B99-089-01 B99-089

ANALYTE	SPIKE pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST	ADDED pCi/g	2σ ERR pCi/g	ORIGINAL pCi/g	2σ ERR (COUNT)	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Tritium	53.2	0.54	0.099	400	J	H	59.0	2.4	0.032	0.052	90	85-115	

200 Area Grndwtr Well Drllng Wst Des

QC-MS#1 32313

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-MS
Version 3.06
Report date 12/01/99

TMA / RICHMOND

SAMPLE DELIVERY GROUP H0594

N910216-01 B0WPB1

DATA SHEET

SDG	7260	Client/Case no	Hanford SDG H0594
Contact	Kevin C. Johnson	Contract	TRB-SBB-207925
Lab sample id	N910216-01	Client sample id	B0WPB1
Dept sample id	7260-001	Location/Matrix	200 Area SOLID
Received	10/27/99	Collected	10/22/99 09:10
% solids	87.6	Custody/SAF No	B99-089-01 B99-089

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI-FIERS	TEST
Gross Alpha	12587-46-1	6.18	3.2	3.8	10	J	80A
Gross Beta	12587-47-2	13.6	4.2	5.6	15	J	80B
Tritium	10028-17-8	0.032	0.052	0.087	400	U	H
Total Uranium (ug/g)	7440-61-1	0.367	0.041	0.005	1.0	J	U_T
Total Strontium	SR-RAD	0.003	0.14	0.20	1.0	U	SR
Potassium 40	13966-00-2	12.4	0.68	0.32			GAM
Cobalt 60	10198-40-0	U		0.034	0.050	U	GAM
Cesium 137	10045-97-3	U		0.029	0.10	U	GAM
Europium 152	14683-23-9	U		0.072	0.10	U	GAM
Europium 154	15585-10-1	U		0.12	0.10	U	GAM
Europium 155	14391-16-3	U		0.064	0.10	U	GAM
Radium 226	13982-63-3	0.478	0.065	0.061	0.10		GAM
Radium 228	15262-20-1	0.938	0.15	0.14	0.20		GAM
Thorium 228	14274-82-9	0.819	0.040	0.037			GAM
Thorium 232	TH-232	0.938	0.15	0.14			GAM
Americium 241	14596-10-2	U		0.051		U	GAM
Uranium 238	U-238	U		4.5		U	GAM
Uranium 235	15117-96-1	U		0.11		U	GAM

200 Area Grndwtr Well Drllng Wst Des

Lab id	TMANC
Protocol	Hanford
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	12/01/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0594

METHOD SUMMARY

TOTAL STRONTIUM IN SOIL

BETA COUNTING

Test SR Matrix SOLID
SDG 7260
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0594

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Total Strontium	
Preparation batch 6904-184						
B0WPB1	N910216-01			7260-001	U	
BLK (QC ID=32311)	N910216-03			7260-003	U	
LCS (QC ID=32310)	N910216-02			7260-002	ok	
Duplicate (N910216-01)	N910216-04			7260-004	-	U
Nominal values and limits from method				RDLs (pCi/g)	1.0	
200 Area Grndwtr Well Drllng Wst Des						

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6904-184	2σ prep error 10.0 %	Reference Lab Notebook 6904 pg. 184														
B0WPB1	N910216-01			0.20	1.00			76		400			28	11/19/99	11/19	GRB-222
BLK (QC ID=32311)	N910216-03			0.20	1.00			75		400				11/19/99	11/19	GRB-224
LCS (QC ID=32310)	N910216-02			0.56	1.00			56		400				11/19/99	11/19	GRB-223
Duplicate (N910216-01) (QC ID=32312)	N910216-04			0.29	1.00			62		400			28	11/19/99	11/19	GRB-225
Nominal values and limits from method				1.0	1.00					100			180			

PROCEDURES	REFERENCE	SRTOTAL
	RP-500	Strontium - Initial Separation, rev 0
	RP-519	Strontium-89,90 Demounting and Yttrium Purification, rev 0

AVERAGES ± 2 SD FOR 4 SAMPLES
MDA 0.31 ± 0.34
YIELD 67 ± 20

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 12/01/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0594

Test 80A Matrix SOLID
SDG 7260
Contact Kevin C. Johnson

METHOD SUMMARY

GROSS ALPHA IN SOIL
GAS PROPORTIONAL COUNTING

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0594

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Gross Alpha
Preparation batch 6904-184					
B0WPB1	N910216-01	80		7260-001	6.18 J
BLK (QC ID=32311)	N910216-03	80		7260-003	U
LCS (QC ID=32310)	N910216-02	80		7260-002	LOW
Duplicate (N910216-01)	N910216-04	80		7260-004	ok
Nominal values and limits from method				RDLs (pCi/g)	10
200 Area Grndwtr Well Drllng Wst Des					

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	RESID mg	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6904-184	2σ prep error 20.0 %	Reference Lab Notebook 6904 pg. 184														
B0WPB1	N910216-01	80		3.8	0.100			26		100			33	11/18/99	11/24	GRB-113
BLK (QC ID=32311)	N910216-03	80		3.8	0.100			34		100				11/18/99	11/24	GRB-115
LCS (QC ID=32310)	N910216-02	80		3.6	0.100			31		100				11/18/99	11/24	GRB-114
Duplicate (N910216-01) (QC ID=32312)	N910216-04	80		3.0	0.100			24		100			33	11/18/99	11/24	GRB-116
Nominal values and limits from method				10	0.100			5-150		100			180			

PROCEDURES

REFERENCE	EPA900.0	
EP-060	Soil Preparation, rev 0	
EP-070	Soil Dissolution, rev 0	
EP-170	Preparation of Solids for Gross Alpha and Gross Beta Counting, rev 1	

AVERAGES ± 2 SD FOR 4 SAMPLES
MDA 3.6 ± 0.76
RESIDUE 29 ± 9

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 12/01/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0594

METHOD SUMMARY

GROSS BETA IN SOIL

GAS PROPORTIONAL COUNTING

Test 80B Matrix SOLID
SDG 7260
Contact Kevin C. Johnson

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0594

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Gross Beta	
Preparation batch 6904-184						
B0WPB1	N910216-01	80		7260-001	13.6	J
BLK (QC ID=32311)	N910216-03	80		7260-003	U	
LCS (QC ID=32310)	N910216-02	80		7260-002	ok	
Duplicate (N910216-01)	N910216-04	80		7260-004	ok	J
Nominal values and limits from method				RDLs (pCi/g)	15	
200 Area Grndwtr Well Drllng Wst Des						

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	RESID mg	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6904-184	2σ prep error 15.0 %	Reference Lab Notebook 6904 pg. 184														
B0WPB1	N910216-01	80		5.6	0.100			26		100			33	11/18/99	11/24	GRB-113
BLK (QC ID=32311)	N910216-03	80		5.6	0.100			34		100				11/18/99	11/24	GRB-115
LCS (QC ID=32310)	N910216-02	80		6.4	0.100			31		100				11/18/99	11/24	GRB-114
Duplicate (N910216-01) (QC ID=32312)	N910216-04	80		7.1	0.100			24		100			33	11/18/99	11/24	GRB-116
Nominal values and limits from method				15	0.100			5-150		100			180			

PROCEDURES	REFERENCE	EPA900.0
	EP-060	Soil Preparation, rev 0
	EP-070	Soil Dissolution, rev 0
	EP-170	Preparation of Solids for Gross Alpha and Gross Beta Counting, rev 1

AVERAGES ± 2 SD FOR 4 SAMPLES
MDA 6.2 ± 1.4
RESIDUE 29 ± 9

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 12/01/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0594

Test GAM Matrix SOLID
SDG 7260
Contact Kevin C. Johnson

METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0594

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Cobalt 60		Cesium 137	
Preparation batch 6904-184								
B0WPB1	N910216-01			7260-001	U		U	
BLK (QC ID=32509)	N910216-07			7260-007	U		U	
LCS (QC ID=32508)	N910216-06			7260-006	ok		ok	
Duplicate (N910216-01)	N910216-08			7260-008	-	U	-	U
Nominal values and limits from method				RDLs (pCi/g)	0.050		0.10	
200 Area Grndwtr Well Drllng Wst Des								

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MAX MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6904-184	2σ prep error 15.0 % Reference Lab Notebook 6904 pg. 184															
B0WPB1	N910216-01			0.10	805					229			38	11/17/99	11/29	02,01,00
BLK (QC ID=32509)	N910216-07			0.011	804					228				11/17/99	11/29	01,04,00
LCS (QC ID=32508)	N910216-06			0.017	804					229				11/17/99	11/29	01,03,00
Duplicate (N910216-01) (QC ID=32510)	N910216-08			0.078	805					202			38	11/17/99	11/29	02,03,00
Nominal values and limits from method				0.050	804					100			180			

PROCEDURES	REFERENCE	GAMMAHI
	EP-060	Soil Preparation, rev 0
	EP-100	Ge(Li) Preparation for Environmental Samples, rev 0

AVERAGES ± 2 SD FOR 4 SAMPLES
MDA 0.052 ± 0.089
YIELD _____ ± _____

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 12/01/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0594

Test U T Matrix SOLID
SDG 7260
Contact Kevin C. Johnson

METHOD SUMMARY

URANIUM, TOTAL IN SOIL
KINETIC PHOSPHORIMETRY

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0594

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	PLANCHET	Total Uranium	
Preparation batch 6904-184						
B0WPB1	N910216-01			7260-001	0.367	J
BLK (QC ID=32311)	N910216-03			7260-003	0	J
LCS (QC ID=32310)	N910216-02			7260-002	ok	X
Duplicate (N910216-01)	N910216-04			7260-004	ok	J
Nominal values and limits from method				RDLs (ug/g)	1.0	
200 Area Grndwtr Well Drllng Wst Des						

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MDA ug/g	ALIQ g	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL- YZED	DETECTOR
Preparation batch 6904-184 2σ prep error 9.0 % Reference Lab Notebook 6904 pg. 184																
B0WPB1	N910216-01			0.005	0.0500								20	11/11/99	11/11	KPA-001
BLK (QC ID=32311)	N910216-03			0	0.0500									11/11/99	11/11	KPA-001
LCS (QC ID=32310)	N910216-02			0.002	0.0500									11/11/99	11/11	KPA-001
Duplicate (N910216-01) (QC ID=32312)	N910216-04			0.005	0.0500								20	11/11/99	11/11	KPA-001
Nominal values and limits from method				1.0	0.0500								180			

PROCEDURES	REFERENCE	UKPA
	EP-060	Soil Preparation, rev 0
	EP-070	Soil Dissolution, rev 0
	EP-044	Preparation of Total Uranium by Kinetic Phosphorimetry, rev 1
	EP-928	Total Uranium by Kinetic Phosphorimetry, rev 0

AVERAGES ± 2 SD FOR 4 SAMPLES
MDA 0.003 ± 0.005
YIELD ____ ± ____

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 12/01/99

TMA/RICHMOND

SAMPLE DELIVERY GROUP H0594

Test H Matrix SOLID
SDG 7260
Contact Kevin C. Johnson

METHOD SUMMARY

TRITIUM IN SOIL
LIQUID SCINTILLATION COUNTING

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0594

RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	Tritium	
Preparation batch 6904-184						
B0WPB1	N910216-01			7260-001	U	
BLK (QC ID=32311)	N910216-03			7260-003	U	
LCS (QC ID=32310)	N910216-02			7260-002	ok	J
Duplicate (N910216-01)	N910216-04			7260-004	-	U
Spike (N910216-01)	N910216-05			7260-005	ok	J
Nominal values and limits from method				RDLs (pCi/g)	400	
200 Area Grndwtr Well Drllng Wst Des						

METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF-FIX	MDA pCi/g	ALIQ g	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6904-184 2σ prep error 10.0 % Reference Lab Notebook 6904 pg. 184																
B0WPB1	N910216-01			0.087	20.0			100		120			39	11/18/99	11/30	LSC-005
BLK (QC ID=32311)	N910216-03			0.086	20.0			100		120				11/18/99	11/30	LSC-005
LCS (QC ID=32310)	N910216-02			0.086	20.0			100		120				11/18/99	11/30	LSC-005
Duplicate (N910216-01) (QC ID=32312)	N910216-04			0.086	20.2			100		120			39	11/18/99	11/30	LSC-005
Spike (N910216-01) (QC ID=32313)	N910216-05			0.099	20.3			100		89			39	11/18/99	11/30	LSC-005
Nominal values and limits from method				400	20.0					25			180			

PROCEDURES

REFERENCE	EPA906.0	
EP-060	Soil Preparation, rev 0	
EP-211	Tritium in Solid Samples by Azeotropic Distillation, rev 0	

AVERAGES ± 2 SD FOR 5 SAMPLES
MDA 0.089 ± 0.011
YIELD 100 ± 0

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-CMS
Version 3.06
Report date 12/01/99

SDG 7260
Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0594

SAMPLE SUMMARY

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

* LAB SAMPLE ID is the lab's primary identification for a sample.

* DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.

* CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.

* QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.

  QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.

* All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 12/01/99

SDG 7260
Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0594

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

* The preparation batches are shown in the same order as the Method Summary Reports are printed.

* Only analyses of planchets relevant to the SDG are included.

* Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.

* The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

  These qualifiers should be reviewed as follows:

  X Some data has been manually entered or modified. Transcription errors are possible.

  P One or more results are 'preliminary'. The data is not ready for final reporting.

  2 There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

  Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

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Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 12/01/99

SDG 7260
Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0594

WORK SUMMARY

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

* TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.

* SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.

* The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.

* PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.

* For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

* The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

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Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 12/01/99

SDG 7260
Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0594

DATA SHEET

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

* TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.

* The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

  The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

* ERRORs can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.

* A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.

* When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

U The RESULT is less than the MDA (Minimum Detectable Activity).

Lab id TMANC
Protocol Hanford
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SDG 7260
Contact Kevin C. Johnson

GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0594

DATA SHEET

If the MDA is blank, the ERROR is used as the limit.

J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.

B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.

Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.

For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.

L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.

H Similar to 'L' except the recovery was high.

P The RESULT is 'preliminary'.

X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.

2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

* An MDA is underlined if it is bigger than its RDL.

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Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
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SDG 7260
Contact Kevin C. Johnson

GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG_H0594

DATA SHEET

* An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.

* A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.

* When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 12/01/99

SDG 7260
Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0594

LAB CONTROL SAMPLE

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.

* An amount ADDED is the lab's value for the actual amount spiked into this sample with its ERROR an estimate of the error of this amount.

  An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

* REC (Recovery) is RESULT divided by ADDED expressed as a percent.

* The first, computed limits for the recovery reflect:

  1. The error of RESULT, including that introduced by rounding the result prior to printing.

     If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

  2. The error of ADDED.

  3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

* The second limits are protocol defined upper and lower QC limits for the recovery.

* The recovery is underlined if it is outside either of these ranges.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 12/01/99

SDG 7260
Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0594

DUPLICATE

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

  If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.

* The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTs divided by their average expressed as a percent.

  If both RESULTs are less than their MDAs, no RPD is computed and a '-' is printed.

  For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

* The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTs prior to printing.

  If this limit is labeled TOT, it includes the preparation error in the RESULTs. If labeled CNT, it does not.

  This value reported for this limit is at most 999.

* The second limit for the RPD is the larger of:

  1. A fixed percentage specified in the protocol.

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Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
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SDG 7260
Contact Kevin C. Johnson

GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0594

DUPLICATE

2. A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.

* The RPD is underlined if it is greater than either limit.

* If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

  Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

* The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

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Protocol Hanford
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Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0594

MATRIX SPIKE

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.

  If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.

* An amount ADDED is the lab's value for the actual amount spiked into the Spike sample with its ERROR an estimate of the error of this amount.

  An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

* REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.

* The first, computed limits for the recovery reflect:

  1. The errors of the two RESULTs, including those introduced by rounding them prior to printing.

     If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

  2. The error of ADDED.

  3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

* The second limits are protocol defined upper and lower QC limits

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
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Report date 12/01/99

SDG 7260
Contact Kevin C. Johnson

GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG H0594

MATRIX SPIKE

for the recovery.

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

* The recovery is underlined (out of spec) if it is outside either of these ranges.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 12/01/99

SDG 7260
Contact Kevin C. Johnson

REPORT GUIDE

Client Hanford
Contract TRB-SBB-207925
Case no SDG_H0594

METHOD SUMMARY

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

* Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

  There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

* The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

  The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

* If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

  The J and X flags are as on the data sheet.

* Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.

* Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

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GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG_H0594

METHOD SUMMARY

means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

* Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.

* If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.

  MDAs are underlined if greater than the printed RDL.

* Aliquots are underlined if less than the nominal value specified for the method.

* Prepareation factors are underlined if greater than the nominal value specified for the method.

* Dilution factors are underlined if greater than the nominal value specified for the method.

* Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.

* Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.

* Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

Lab id TMANC
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GUIDE, cont.

Client Hanford
Contract TRB-SBB-207925
Case no SDG_H0594

METHOD SUMMARY

* Count times are underlined if less than the nominal value specified for the method.

* Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.

* Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.

* Days Held are underlined if greater than the holding time specified in the protocol.

* Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1÷3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant

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Contact Kevin C. Johnson

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Case no SDG H0594

METHOD SUMMARY

results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. Results less than their MDA are not included. No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the measurements.

Lab id TMANC
Protocol Hanford
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 12/01/99

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-089-01	Page 1 of 1

Collector: L.D. Walker	Company Contact: Ed Rafuse	Telephone No.: 373-1211	Project Coordinator: TRENT, SJ	Price Code: 8L; Data Turnaround: 21 Days
Project Designation: 200 Area Groundwater Well Drilling Waste Designation	Sampling Location: 200 Area		SAF No.: B99-089	
Ice Chest No.: ERC 99-018	Field Logbook No.: NA		Method of Shipment: Federal Express	
Shipped To: TMA/RECRA RF 10-22-99	Offsite Property No.: ~~A00 0008~~ A000010 RT 10-26-99		Bill of Lading/Air Bill No.: ~~4235 7953 1024~~ 4238 7953 1074 RT 10-26-98	
			COA: JGWMON3200	

POSSIBLE SAMPLE HAZARDS/REMARKS											
	Preservation	None	None	None	None	None	None				
	Type of Container	aG	aG	aG	aG	aG	aG				
	No. of Container(s)	1	1	1	1	1	3				
Special Handling and/or Storage	Volume	60mL	60mL	60mL	120mL	120mL	500mL				
SAMPLE ANALYSIS		Gross Alpha; Gross Beta	Strontium-89,90 – Total Sr	Total Uranium	See item (1) in Special Instructions.	Tritium - H3	See item (2) in Special Instructions.				

Sample No.	Matrix *	Sample Date	Sample Time										
B0WPB1	Soil	10/22/99	0910	X	X	X	~~X~~ RF 10-22-99	X	X			B0WPB8	
~~B0WPB2~~	~~Soil~~ LDW 10-22-99												

CHAIN OF POSSESSION	Sign/Print Names	
Relinquished By: L.D. Walker / [signature] Date/Time: 10/22/99 1045	Received By: DC Weekes / [signature] Date/Time: 10/22/99 1045	
Relinquished By: DC Weekes / [signature] Date/Time: 10/22/99 1225	Received By: Ref 2-C Date/Time: 10-22-99 1225	
Relinquished By: Ref 2-C Date/Time: 10-25-99/07:45	Received By: Rikki Thoren / R Thoren Date/Time: 10-25-99/0745	
Relinquished By: Rikki Thoren / R Thoren Date/Time: 10-25-99/1430	Received By: FEDEX Date/Time: 10/26/99	

SPECIAL INSTRUCTIONS

(1) TCLP VOA -- 1311/8260A {1,1-Dichloroethene, 1,2-Dichloroethane, 2-Butanone, Benzene, Carbon tetrachloride, Chlorobenzene, Chloroform, Tetrachloroethene, Trichloroethene, Vinyl chloride}
(2) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}

Matrix *: Soil, Water, Vapor, Other Solid, Other Liquid

LABORATORY SECTION	Received By: M. Goldenberg	Title: NU	Date/Time: 10/27/99 10:00
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Thermo NUtech - Richmond

SAMPLE RECEIPT CHECKLIST

SAMPLE RECEIPT

Client: Bechtel Hanford Inc Date/Time received 10-27-99 10:00

CoC No. B99-089-01

Container I.D. No. _____ Requested TAT (Days) 21 P.O. Received Yes [ ] No [✓]

INSPECTION

1.	Custody seals on shipping container intact?	Yes [✓]	No [ ]	N/A [ ]
2.	Custody seals on shipping container dated & signed?	Yes [✓]	No [ ]	N/A [ ]
3.	Custody seals on sample containers intact?	Yes [✓]	No [ ]	N/A [ ]
4.	Custody seals on sample containers dated & signed?	Yes [✓]	No [ ]	N/A [ ]
5.	Cooler Temperature: _____	Packing material is:	Wet [ ]	Dry [✓]
6.	Number of samples in shipping container: 1			
7.	Number of containers per sample: _____ (Or see CoC ✓)			
8.	Paperwork agrees with samples?	Yes [✓]	No [ ]	
9.	Samples have: Tape [ ] Hazard labels [ ] Rad labels [✓] Appropriate sample labels [✓]			
10.	Samples are: In good condition [✓] Leaking [ ] Broken Container [ ] Missing [ ]			

11. Describe any anomalies: _____

13. Was P.M. notified of any anomalies? Yes [ ] No [ ] Date _____

14. Received by M. Goldenberg Date: 10-27-99 Time: 10:00

LOGIN

TNU W.O. No. _____ Group No. _____ Client W.O. No. _____

PROGRAM MANAGER

Sample holding times exceeded? Yes [ ] No [ ]

Client Notified: Name _____ Date/time _____

RECRA LabNet
a division of Recra Environmental, Inc.
Virtual Laboratories Everywhere

Recra LabNet Philadelphia
Analytical Report

Client : TNU-HANFORD B99-089
RFW# : 9910L526
SDG/SAF #: H0594/B99-089

W.O. #: 10985-001-001-9999-00
Date Received: 10-27-99

GC/MS VOLATILE-TCLP

One (1) leachate sample was generated from a soil sample collected on 10-22-99.

The sample and its associated QC samples were analyzed according to criteria set forth in Recra OPs based on SW 846 Method 8260A for TCLP Volatile target compounds on 11-12,13-99.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

1. The cooler temperature upon receipt has been recorded on the chain-of-custody.

2. The required analysis holding time was met.

3. The samples were analyzed at five-fold dilutions due to the leachate matrix; however, all TCLP regulatory limits were achieved.

4. All surrogate recoveries were within EPA QC limits.

5. All matrix spike recoveries were within EPA QC limits.

6. All blank spike recoveries were within EPA QC limits.

7. The leachate blank contained the target compound Benzene at a level greater than the reporting limit; however, it was less than the regulatory limit.

J. Michael Taylor
Vice President
Philadelphia Analytical Laboratory

11-30-99
Date

som\group\data\voa\tnu0t526.doc

GLOSSARY OF VOA DATA

DATA QUALIFIERS

U = Compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit which is included and corrected for dilution and percent moisture.

J = Indicates an estimated value. This flag is used under the following circumstances: 1) when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed; or 2) when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. For example, if the limit of detection is 10 ug/L and a concentration of 3 ug/L is calculated, it is reported as 3J.

B = This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag is also used for a TIC as well as for a positively identified TCL compound.

E = Indicates that the compound was detected beyond the calibration range and was subsequently analyzed at a dilution.

D = Identifies all compounds identified in an analysis at a secondary dilution factor.

I = Interference.

NQ = Result qualitatively confirmed but not able to quantify.

N = *Indicates presumptive evidence of a compound. This flag is only used for tentatively identified* compounds (TICs), where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N code is not used.

X = This flag is used for a TIC compound which is quantified relative to a response factor generated from a daily calibration standard (rather than quantified relative to the closest internal standard).

Y = Additional qualifiers used as required are explained in the case narrative.

GLOSSARY OF VOA DATA

ABBREVIATIONS

BS = Indicates blank spike in which reagent grade water is spiked with the CLP matrix spike solutions and carried through all the steps in the method. Spike recoveries are reported.

BSD = Indicates blank spike duplicate.

MS = Indicates matrix spike.

MSD = Indicates matrix spike duplicate.

DL = Suffix added to sample number to indicate that results are from a diluted analysis.

NA = Not Applicable.

DF = Dilution Factor.

NR = Not Required.

SP, Z = Indicates Spiked Compound.

Recra LabNet - Lionville Laboratory
Volatiles by GC/MS, TCLP Leachate
Report Date: 11/29/99 17:47

RFW Batch Number: **9910L526** Client: **TNU-HANFORD B99-089** Work Order: 10985001001 Page: 1a

	Cust ID:	B0WPB1	B0WPB1	B0WPB1	VBLKAG	VBLKAG BS	LCHBLK
Sample Information	RFW#:	002	002 MS	002 MSD	99LVH548-MB1	99LVH548-MB1	99LTV054-LB1
	Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
	D.F.:	5.00	5.00	5.00	1.00	1.00	5.00
	Units:	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
Surrogate Recovery	Toluene-d8	103 %	98 %	97 %	97 %	100 %	96 %
	Bromofluorobenzene	98 %	93 %	92 %	94 %	97 %	91 %
	1,2-Dichloroethane-d4	92 %	87 %	88 %	92 %	96 %	84 %
Vinyl Chloride		0.050 U	90 %	85 %	0.010 U	83 %	0.050 U
1,1-Dichloroethene		0.025 U	100 %	95 %	0.005 U	94 %	0.025 U
Chloroform		0.025 U	101 %	95 %	0.005 U	97 %	0.025 U
1,2-Dichloroethane		0.025 U	91 %	87 %	0.005 U	95 %	0.025 U
2-Butanone		0.050 U	96 %	99 %	0.010 U	103 %	0.050 U
Carbon Tetrachloride		0.006 J	98 %	92 %	0.005 U	96 %	0.025 U
Trichloroethene		0.025 U	97 %	91 %	0.005 U	99 %	0.025 U
Benzene		0.005 J	101 %	97 %	0.005 U	105 %	0.20
Tetrachloroethene		0.025 U	96 %	92 %	0.005 U	95 %	0.025 U
Chlorobenzene		0.025 U	100 %	96 %	0.005 U	102 %	0.025 U

*= Outside of EPA CLP QC limits.

11-30-99

Recra LabNet - Lionville Laboratory
Volatiles by GC/MS, TCLP Leachate
Report Date: 11/29/99 17:47

RFW Batch Number: **9910L526** Client: **TNU-HANFORD B99-089** Work Order: 10985001001 Page: 2a

Cust ID: **VBLKAH**

Sample Information
RFW#: **99LVH549-MB1**
Matrix: WATER
D.F.: 1.00
Units: MG/L

Surrogate Recovery	Toluene-d8	100	%
	Bromofluorobenzene	96	%
	1,2-Dichloroethane-d4	91	%

Vinyl Chloride	0.010	U
1,1-Dichloroethene	0.005	U
Chloroform	0.005	U
1,2-Dichloroethane	0.005	U
2-Butanone	0.010	U
Carbon Tetrachloride	0.005	U
Trichloroethene	0.005	U
Benzene	0.005	U
Tetrachloroethene	0.005	U
Chlorobenzene	0.005	U

*= Outside of EPA CLP QC limits.

Recra LabNet - Lionville Laboratory
VOA ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-089

DATE RECEIVED: 10/27/99 RFW LOT # :9910L526

CLIENT ID	RFW #	MTX	PREP #	LEACH DATE	EXTR/PREP	ANALYSIS
B0WPB1	002	W	99LVH548	11/03/99	N/A	11/12/99
B0WPB1	002 MS	W	99LVH548	11/03/99	N/A	11/12/99
B0WPB1	002 MSD	W	99LVH548	11/03/99	N/A	11/12/99
LAB QC:						
VBLKAG	MB1	W	99LVH548	N/A	N/A	11/12/99
VBLKAG	MB1 BS	W	99LVH548	N/A	N/A	11/12/99
99LTV054-LB1	LB1	W	99LVH549	N/A	N/A	11/13/99
VBLKAH	MB1	W	99LVH549	N/A	N/A	11/13/99

11-30-99

ADDENDUM

This report provides Toxicity Characteristics Leaching Procedure (TCLP) information. Listed on the next page, the client identification on the ITCL labchron, "TCLP" represents the non-volatile leachate fraction and "TCLP LEACHATE" represents the Zero Headspace Extraction (ZHE) volatile leachate fraction. The "EXTR/PREP DATE" is the date the leachate preparation was initiated; the "ANALYSIS DATE" is the date the leachates were completed.

Recra LabNet - Lionville Laboratory
INORGANIC ANALYTICAL DATA PACKAGE FOR
TNU-HANFORD B99-089

DATE RECEIVED: 10/27/99 RFW LOT # :9910L526

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B0WPB1						
TCLP LEACHATE	001	S	99LTV054	10/22/99	11/02/99	11/03/99

RECRA LabNet Use Only

9910L526

Custody Transfer Record/Lab Work Request

Page 1 of 1

All FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

RECRA LabNet

Client TOU Hanford B99-089

Est. Final Proj. Sampling Date

Project # 10985-001-001-9999-00

Project Contact/Phone #

RECRA Project Manager OJ

QC Spec. Del Std TAT 21 days

Date Rec'd 10.27.99 Date Due 11/17/99

Account #

Refrigerator # 1

#/Type Container: Liquid; Solid 1 Ae

Volume: Liquid; Solid 120

Preservatives

ANALYSES REQUESTED → ORGANIC: TCLP VOA, BNA, Pest/PCB, Herb; Headspace; INORG: Metal, CN

RECRA LabNet Use Only

MATRIX CODES: S - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; L - EP/TCLP Leachate; WI - Wipe; X - Other; F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	TCLP VOA	BNA 10/28/99	Pest/PCB	Herb	Headspace 0624T	Metal	CN
001	BOWPB1	X	X	S	10/26/99	0910	X						
002	BOWPB1 tclp of 001	X	X	L	*	—	✓						

Special Instructions:

saf # B99-089

COMPOSITE WASTE

DATE/REVISIONS:

1. * see labchron
2.
3.
4.
5.
6.

RECRA LabNet Use Only

Samples were ✓ 1) Shipped ___ or Hand Delivered ___

Airbill # *

2) Ambient or (Chilled)

3) Received in Good Condition (Y) or N

4) Labels Indicate Properly Preserved (Y) or N

5) Received Within Holding Times (Y) or N

COC Tape was: 1) Present on Outer Package (Y) or N; 2) Unbroken on Outer Package (Y) or N; 3) Present on Sample (Y) or N; 4) Unbroken on Sample (Y) or N

COC Record Present Upon Sample Rec't (Y) or N

Cooler Temp. 2.1 °C

Relinquished by	Received by	Date	Time
FedEx	[signature]	10/27/99	0930

Relinquished by	Received by	Date	Time
ORIGINAL REWRITTEN			

Discrepancies Between Samples Labels and COC Record? Y or (N)

NOTES:

* 423579531080

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B99-089-01	Page 1 of 1

Collector: L.D. Walker	Company Contact: Ed Rafuse — Telephone No.: 373-1211	Project Coordinator: TRENT, SJ	Price Code: 8L — Data Turnaround: 21 Days
Project Designation: 200 Area Groundwater Well Drilling Waste Designation	Sampling Location: 200 Area	SAF No.: B99-089	
Ice Chest No.: ERC 99028	Field Logbook No.: NA	Method of Shipment: Federal Express	
Shipped To: ~~TMA~~/RECRA Rec 10-22-99	Offsite Property No.: ~~A000 000~~ A000011	Bill of Lading/Air Bill No.: 42357953 1085	
		COA: JGWMON3200	

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	None	None	None	None	None				
	Type of Container	aG	aG	aG	aG	aG	aG				
	No. of Container(s)	1	1	1	1	1	3				
Special Handling and/or Storage	Volume	60mL	60mL	60mL	120mL	120mL	500mL				
SAMPLE ANALYSIS		Gross Alpha; Gross Beta	Strontium-89,90 -- Total Sr	Total Uranium	See item (1) in Special Instructions.	Tritium - H3	See item (2) in Special Instructions				

Sample No.	Matrix *	Sample Date	Sample Time										
B0WPB1	Soil	10/22/99	0910	X	X	X	X	X	X			Bow	PBB
~~B0WPB2~~	~~Soil~~ 4DW 10-22-99				Ref		10-22-99						

CHAIN OF POSSESSION	Sign/Print Names	Date/Time
Relinquished By	L.D. Walker	10/22/99 1045
Received By	DC Weekes	10/22/99 1045
Relinquished By	DC Weekes	10/22/99 1225
Received By	Ref 2-C	10.22.99 1225
Relinquished By	Ref 2-C	10.26.99/0800
Received By	R. Thoren	10.26.99 0800
Relinquished By	R. Thoren	10/26/99/1430
Received By	FED EX	

SPECIAL INSTRUCTIONS

(1) TCLP VOA – 1311/8260A {1,1-Dichloroethene, 1,2-Dichloroethane, 2-Butanone, Benzene, Carbon tetrachloride, Chlorobenzene, Chloroform, Tetrachloroethene, Trichloroethene, Vinyl chloride}
(2) Gamma Spectroscopy {Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155}

9910L526 temp 2.1°

Matrix *
Soil
Water
Vapor
Other Solid
Other Liquid

LABORATORY SECTION	Received By	Date/Time
	FED EX	10/27/99 09:30

FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time